AEROBIC FITNESS IN YOUNG SOCCER PLAYERS:
THE YO-YO INTERMITTENT ENDURANCE TEST AS
INDICATOR OF AEROBIC POWER AND ANAEROBIC
THRESHOLD
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Introduction
It has been demonstrated that soccer performance re-
quires well-developed aerobic and anaerobic fitness. Con-
sequently, the assessment of the VO2max and anaerobic
threshold is important for monitoring the effectiveness of
the physical training program of the soccer players. These
aerobic fitness measurements are accurately evaluated us-
ing a variety of laboratory protocols during treadmill con-
tinuous running until exhaustion. However, the soccer
performance is characterized by an intermittent and high-
intensity physical effort. Therefore, it seems logical to eval-
uate the athletes’ capacity with sport-specific endurance
tests. For this reason, some field tests have been proposed
as practical and specific alternatives to laboratory assess-
ments. One of the most popular is the Yo-yo Intermittent
Endurance Test Level 2 (YIET-2), suggested by Bangsbo
(1994) for well-trained subjects. The purpose of this study
was to analyse the YIET-2 as indicator of aerobic power
and anaerobic threshold in youth soccer players.

Methods
Physiological responses were determined in eighteen well-
trained elite young soccer players (age = 17.4 ± 0.5 years
old; body mass = 71.7 ± 7.4 kg) while performing the Yo-
yo Intermittent Endurance Test (YIET) and a Progressive
continuous Running Treadmill Test (PRTT) until exhaustion.
Maximal heart rates (HRmax), respiratory exchange ratio
(RER), O2 pulse, maximal ventilation (VEmax), oxygen up-
take (VO2 ), and expired carbon dioxide (VCO2 ) were
measured. Expired gases in both conditions were analyzed
using a portable lightweight breath-by-breath gas analyzer
(K4b2; Cosmed, Rome, Italy). The Ventilatory Threshold
(VT) was detected by V-slope method.
Paired-Samples T Test was used to determine if there were
significant differences in the physiological responses in the
PRTT and YIET. Correlation coefficients were used to de-
termine the relationship in the performances and selected
physiological measures between tests.

Results
Results showed that VO2max, HRmax, RER, O2 pulse,
and VEmax were not significantly different between PRTT
and YIET performance (p<0.05). There were a positive
correlations in the measured VO2max in both PRTT and
YIET (p<0.01). However, there no significant correlations
between players’ performance in the YIET (i.e. number of
completed shuttles or total distance covered) and the mea-
sured VO2max in both laboratory and in field conditions. In
contrast, there were strong significant correlations between
the same YIET performance and the ventilatory threshold
measured in PRTT (p<0.01). These findings show that
YIET and PRTT elicit similar cardio respiratory responses.

However, the players’ performance in the YIET seems to
be a weak indicator of aerobic power in youth well trained
soccer players. Probably, the YIET can be considered an
aerobic-anaerobic soccer-specific field test, and can be re-
garded as a good indicator of aerobic capacity.

References
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